GROUP 54A

CHASSIS ELECTRICAL

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GENERAL INFORMATION

M2540000100302

FEATURES

IMPROVEMENT OF VISUAL OBSERVATION AND SAFETY, AND ENHANCEMENT OF USER-FRIENDLINESS AND VERSATILITY

- The large four headlamps with the lightweight resin lenses have been adopted.
- The high-mounted stop lamp has been installed on the tailgate for all models.
- Combination meters and ECUs are connected using CAN to ensure the transmission of information.
- The combination meters are provided integrated with a perfect round-shaped speedometer where the needles operate at the wider angle.

IMPROVEMENTS IN SERVICE QUALITY

- Diagnosis connector for inspection with M.U.T.-III is installed.
- Diagnosis and service data are integrated in the combination meter, enabling communication with M.U.T.-III

BETTER PRODUCT PACKAGE

- The smart wiring system (SWS) has been adopted for the lamp control including the headlamp auto turn-off and fog lamp unattended-operation reminder.

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DIAGNOSIS SYSTEM

M2540001000472

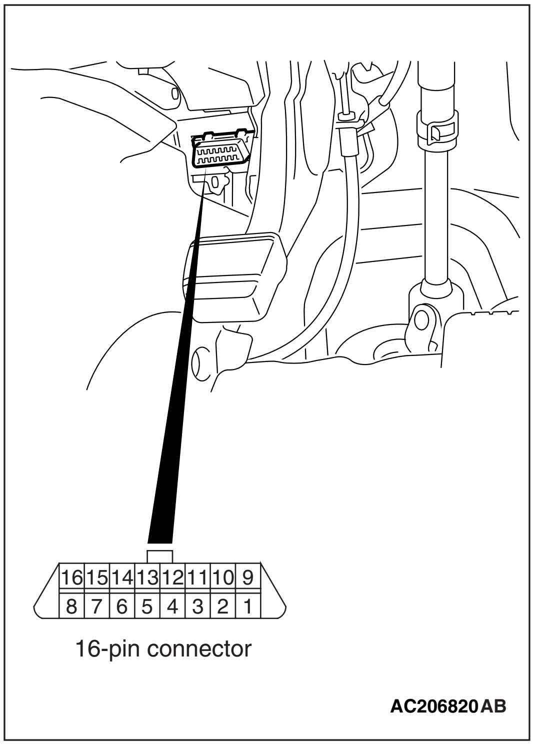
For improved serviceability, a diagnosis connector for M.U.T.-III inspection is built into the instrument panel near the position of the driver's left foot.

Diagnostic Function	MPI	ABS or ASC	CVT	EPS	Combination meter		SRS air bag	Immobilizer	ETACS
					Meter	A/C			
Diagnosis code set	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
Service data sent	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Not applicable
Actuator test	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Not applicable	Not applicable	Not applicable
Diagnosis record stored	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
Diagnosis deletion using M.U.T.-III	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
Pulse check using M.U.T.-III	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Applicable
Status indication by diagnosis code*	Not applicable	Applicable	Not applicable	Applicable	Applicable	Applicable	Not applicable	Not applicable	Applicable
Estimated vehicle speed sent	Not applicable	Not applicable	Not applicable	Applicable (via CAN)	Applicable (via CAN)	Not applicable	Not applicable	Not applicable	Applicable (via CAN)
ECU version No. displayed	Not applicable	Applicable	Not applicable	Applicable	Applicable	Applicable	Not applicable	Not applicable	Not applicable

*NOTE: *: If a diagnosis code is sent for this function, the display informs users whether a mechanical problem currently exists or whether it existed before but normal operation has been restored. The message for the former state identifies it as active trouble and the message for the latter identifies it as stored trouble.*

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DIAGNOSIS CONNECTOR



Diagnosis connector (black)	
1	Diagnosis control
2	–
3	SWS communication line
4	Earth
5	Earth
6	CAN communication line (CAN_H)
7	MPI, CVT, SRS air bags and immobilizer
8	–
9	ETACS
10	–
11	ECU optimisation control
12	–
13	–
14	CAN communication line (CAN_L)
15	–
16	Battery power supply

BATTERY

M2540002000282

Item	75D23L
Voltage V	12
Capacity (5-hour rate) Ah	52
Electrolytic fluid specific gravity (fully charged state at 20°C)	1.280

IMMOBILIZER SYSTEM

M2540003000490

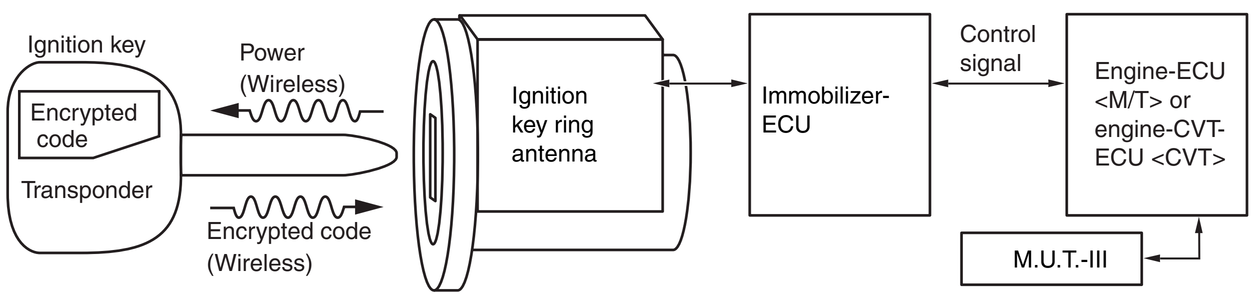
The engine immobilizer system prevents the engine from starting and immobilizes the vehicle if a key other than the key registered for that vehicle is used in an attempt to start the engine after forced entry. The engine immobilizer system consists of the ignition key, key ring antenna, immobilizer-ECU, engine-ECU <M/T> and engine-CVT-ECU <CVT>. It works in the following way and has these functions.

1. With the ignition key turned ON, the transponder (a small transmitter) integrated in the ignition key transmits its own encrypted code to the ring antenna via radio wave.
2. According to the sent encrypted code, the immobilizer-ECU controls the engine-ECU <M/T> or engine-CVT-ECU <CVT> only when the sent encrypted code agrees with the pre-registered one.
3. The system is designed to be maintenance-free because the power source for the transponder is supplied by the immobilizer-ECU. Three ignition keys are provided, and up to eight keys can be registered to one vehicle as needed. More than one trillion of encrypted code combinations can be registered, and parts of them are irregularly changed whenever the ignition key is turned ON. This feature prevents code copying, resulting in higher security of the system.

DIAGNOSIS CODE TABLE

Diagnosis code No.	Diagnosis item
11	Transponder communication system or radio interference of encrypted code
12	Encrypted codes are not the same or are not registered

CONSTRUCTION DIAGRAM



AC306415AD

MAIN COMPONENTS

Component name	Outline of function
Immobilizer-ECU with an antenna	• Supplies electrical power to the transponder integrated in the ignition key, and transmits random number data. • Verifies the encrypted code which is sent from the transponder. If the code is correct, it sends an engine mobilization signal to the engine-ECU <M/T> or engine-CVT-ECU <CVT>.
Transponder	Is power-supplied by the immobilizer-ECU. When the transponder receives random number data, it processes it and the encrypted code. Then it transmits the process result to the immobilizer-ECU.
Engine-ECU <M/T> or engine-CVT-ECU <M/T>	Starts the engine, and then continues the engine running if an engine mobilization signal is confirmed. If an engine immobilization signal is confirmed, the ECU cancels the engine control and stops the engine.

Encrypted code registration criteria table

The ignition key contains a transponder (small transmitter), which retains an unique encrypted code. Under any of the conditions below, the encrypted code must be registered in the immobilizer-ECU again. The immobilizer-ECU can retain maximum eight different encrypted codes. This means that maximum eight ignition keys can be registered.

Component to be replaced	**Engine-ECU <M/T> or engine-CVT-ECU <CVT>**	**Immobilizer-ECU**	**Ignition key**
When Engine-ECU <M/T> or engine-CVT-ECU <CVT> is replaced	–	Must be replaced	Must be replaced
			All ignition keys must be registered again
When immobilizer-ECU is replace	Must not be replaced	–	Must not be replaced
			All ignition keys must be registered again
When ignition key is added	Must not be replaced	Must not be replaced	• Additional ignition key must be registered • All ignition keys must be registered again
When ignition key is lost	Must not be replaced	Must not be replaced	All the ignition keys other than the lost one must be registered again

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LIGHTING

M2540004000932

EXTERIOR LAMPS

- The headlamp employs a large four-lamp type integrated with the front turn-signal lamp and position lamp, creating the integrity appearance with the hood. The internal lens design looks like a precision machine, achieving improved appearance.
- The fog lamp is standard equipped. (VRX, VR and RALLIART version-R : Standard equipment, LS : Option)
- The rear combination lamps are a large vertical-type integrated with the tail lamp, stop lamp, rear turn-signal lamp and back-up lamp.
- The high-mounted stop lamp is equipped as standard in order to improve safety.

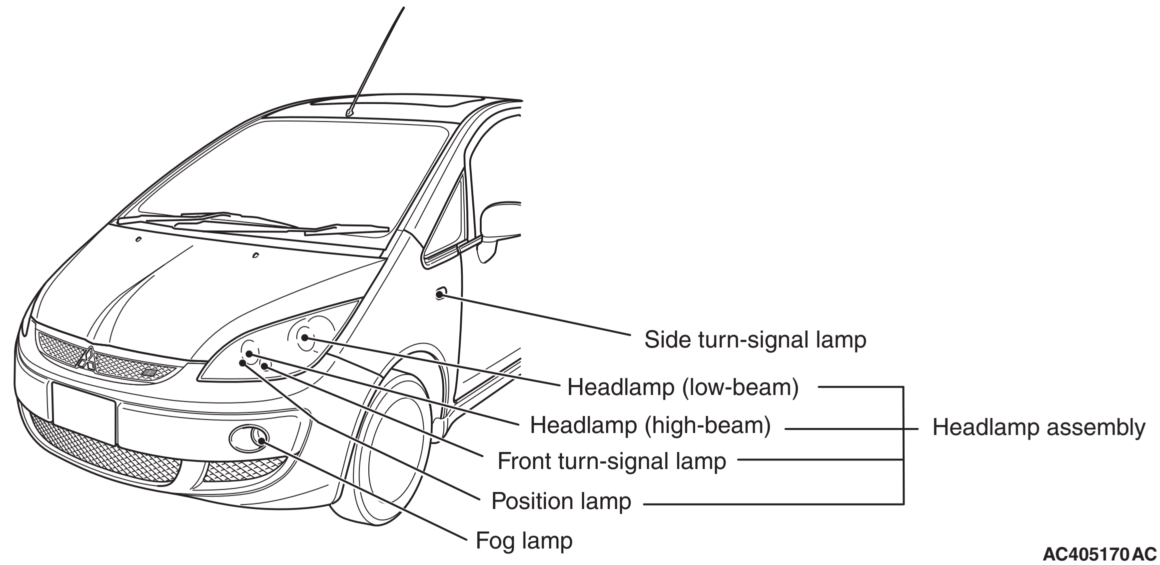
Specifications

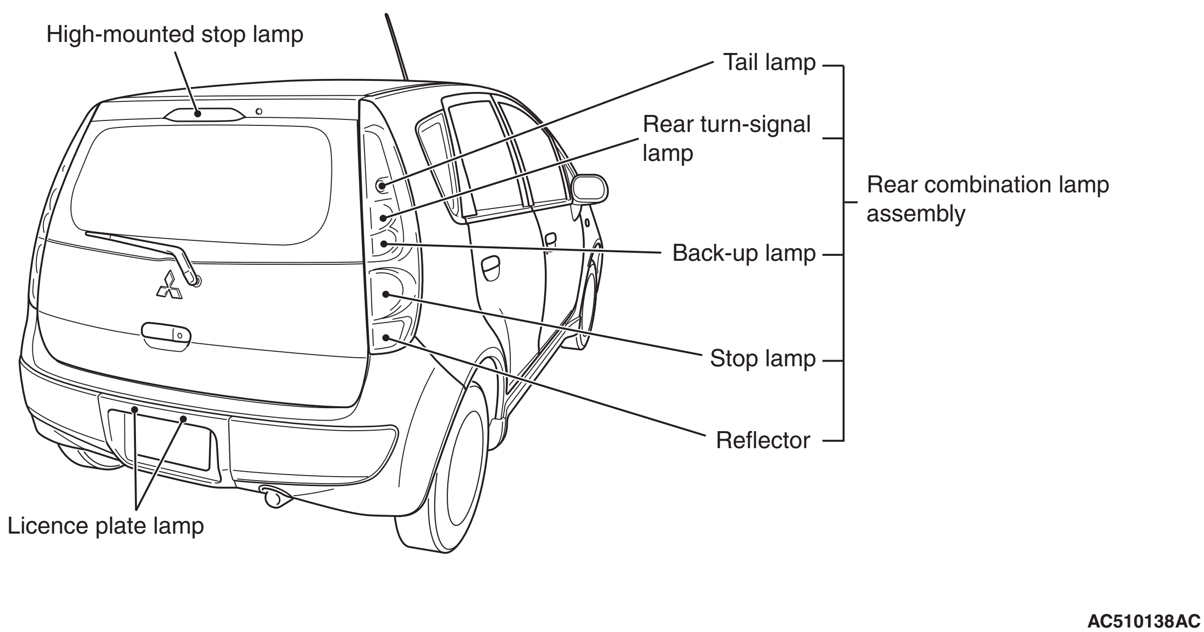
Item			Specification
Headlamp assembly	Headlamp (halogen bulb)	Low-beam W	55 (H7)
		High-beam W	55 (H1)
	Position lamp W		5 (W5W)
	Front turn-signal lamp W		21 (W21W)
Fog lamp W			55 (H11)
Side turn-signal lamp W			5 (WY5W)
Rear combination lamp assembly	Tail lamp W		5 (W5W)
	Stop lamp W		21 (W21W)
	Rear turn-signal lamp W		21 (W21W)
	Back-up lamp W		21 (W21W)
High-mounted stop lamp W x units			5 × 4 (W5W)
Licence plate lamp W			5 (W5W)

NOTE: The brackets ( ) show the bulb type.

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CONSTRUCTION DIAGRAM





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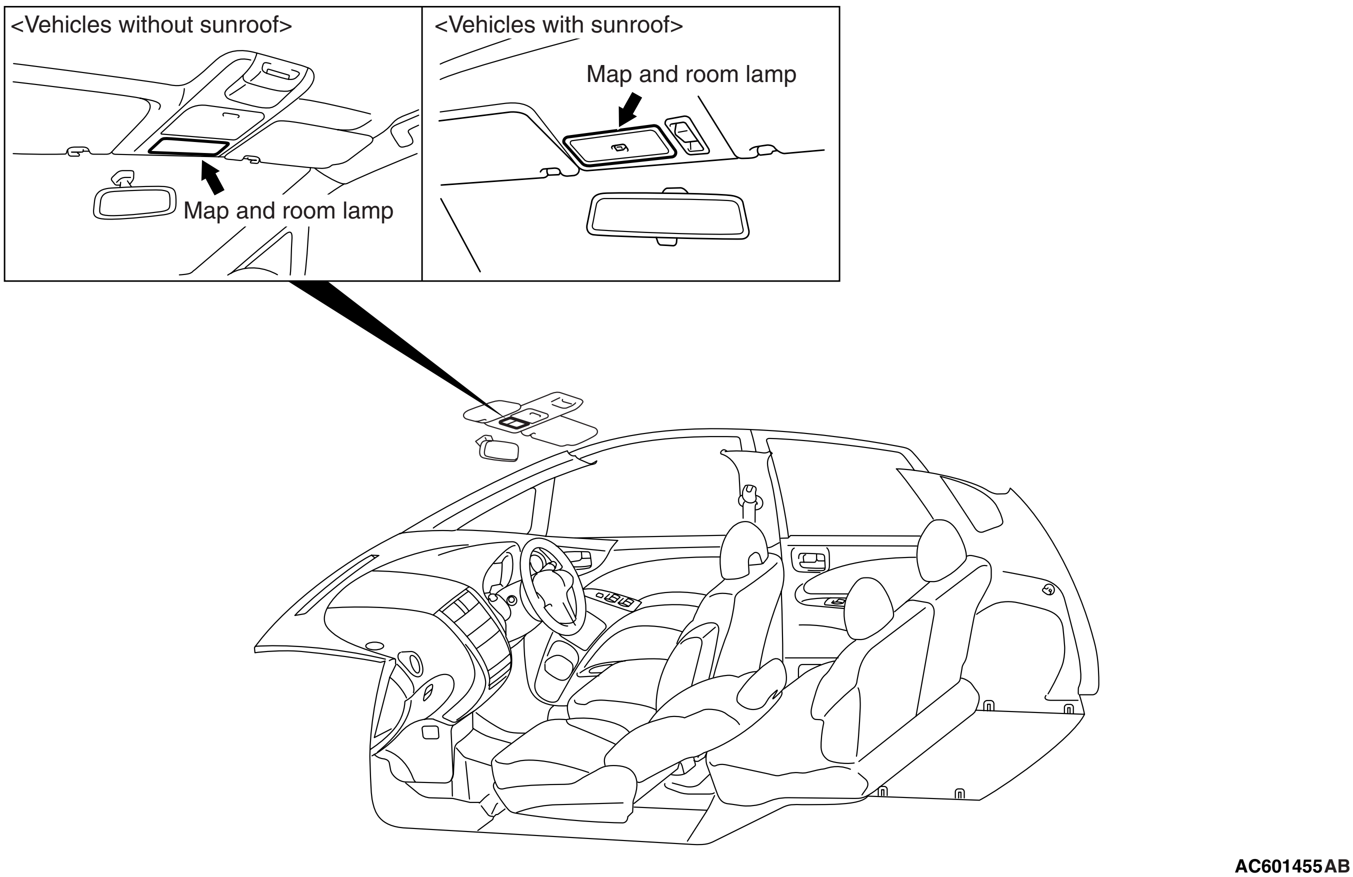
INTERIOR LAMP

The lens-push type map and room lamp is adopted so that an excellent operationability can be achieved allowing operation from driver and passenger seats.

Specifications

Item		Specification
Map and room lamp	W × units	8 × 2

CONSTRUCTION DIAGRAM



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COMBINATION METER

M2540005000894

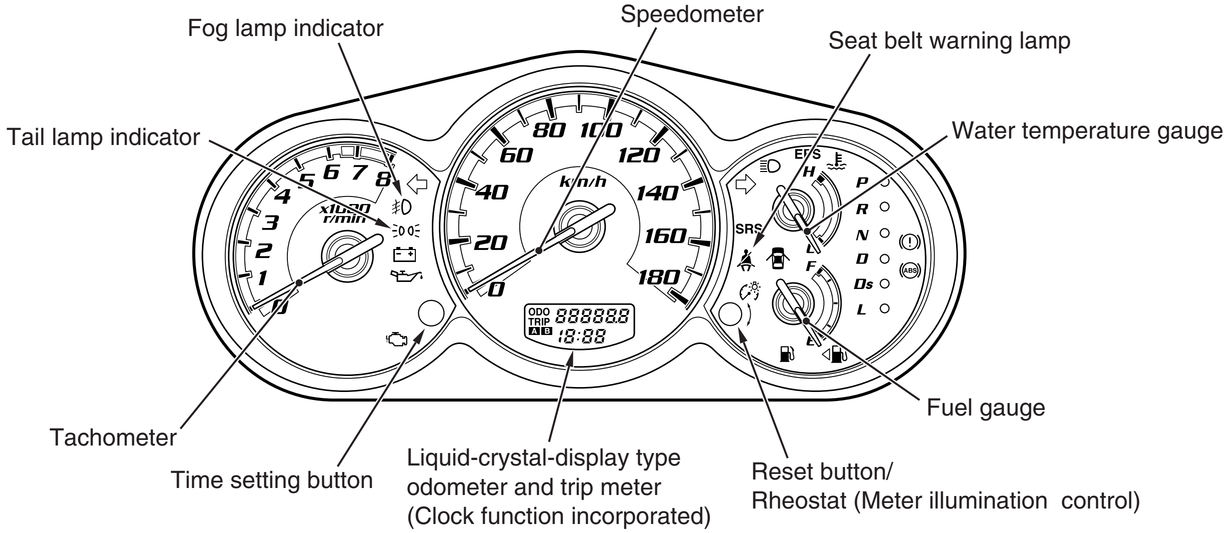
The combination meter features large, clearly visible analogue indicators. The meter has the speedometer in the middle, the coolant temperature gauge at upper right, the fuel gauge at lower right, and the tachometer at left so that drivers can easily distinguish the information from the meters. The combination meter offers the following advantages.

- The combination meter is used for air conditioner and meter drive control to integrate ECU.
- CAN communication is used for more reliable transmission of all gauge data and indicator lamp input signals, such as vehicle speed, engine RPM, and coolant temperature. For further details on CAN, refer to GROUP 54C, CAN P.54C-2. The signals that the combination meter uses are described in the CAN communications input signals table .
- Several diagnosis functions such as the diagnosis code memory and actuator tests are prepared in order to improve serviceability.
- For a brighter display at night and for a longer useful life, all indicator lamps, warning lamps, and illumination bulbs use LEDs.
- The indicators for the speedometer, fuel gauge, and other gauges are driven by a stepping motor. For further details, consult the stepping motor section .
- The electronic speedometer operates by receiving vehicle speed signals sent by the engine-ECU <M/T> or engine-CVT-ECU <CVT> via the CAN.
- A large and clear LCD type odo-tripmeter is provided. The odometer continuously displays values while the tripmeter adopts a twin-trip (trip A, trip B) function which is switched by a reset button. In addition, clock function is incorporated.
- A fog lamp indicator lamp is provided to let the driver know that the fog lamp is on.
- A seat belt warning lamp is installed to encourage the driver to fasten the seat belt.
- The high-contrast meter is adopted. When the ignition is turned ON, such as the needles and face display are illuminated with fade-in lighting by the LED light source. <VRX>
- To further accentuate the high-contrast lighting, the light of the high-contrast meter fades in and fades out when the light is turned on and off respectively. <VRX>
- With the auto illumination function incorporated in the high-contrast meter, a two-stage switching of daytime (non-dimming) and nighttime (dimming) is achieved. Also, the brightness can be adjusted using the illumination control knob. <VRX>
- A tail lamp indicator lamp is installed which informs the lighting status of the tail lamps to the driver. <VRX>

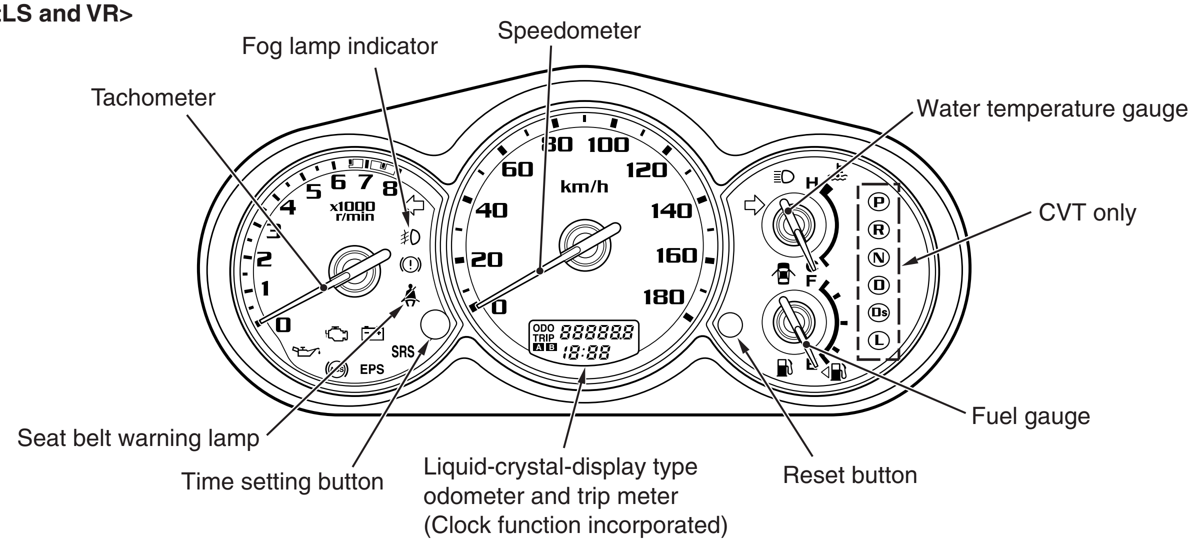
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CONSTRUCTION DIAGRAM

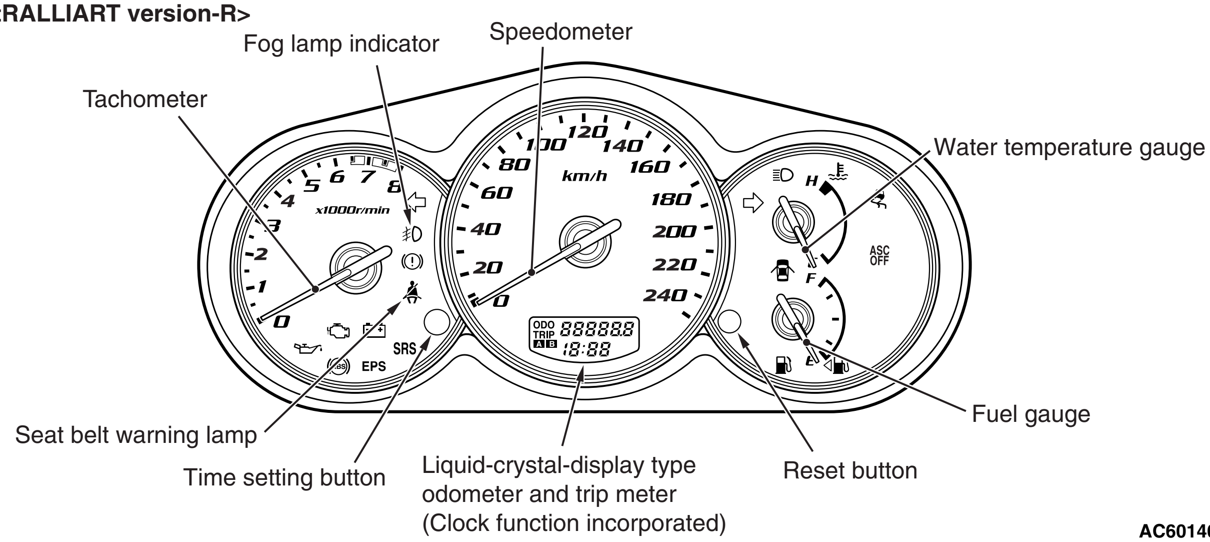
<VRX>



<LS and VR>



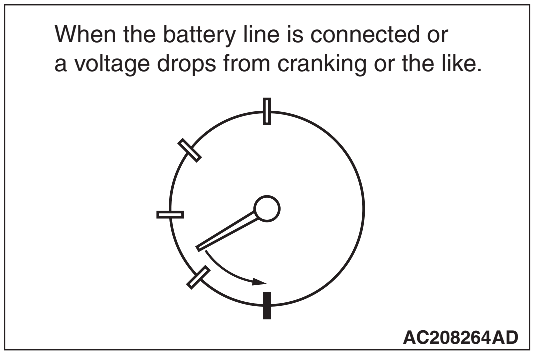
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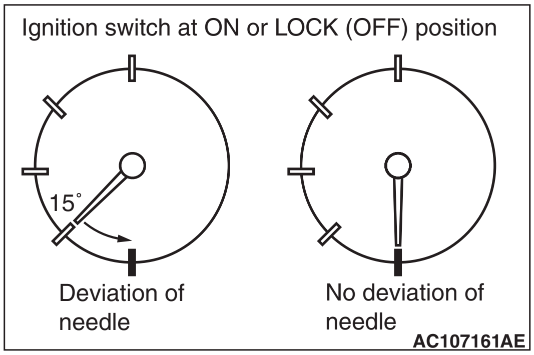


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STEPPING MOTOR





These gauges use a stepping motor as the drive mechanism for the indicators (called the "movement"). Compared with conventional movements, the torque for driving the indicators is much greater for superior indicator accuracy and more stable response. The indicator position displayed is determined as the microcontroller circuit in the gauge controls the stepping motor. In conventional gauges, the indicator revolves 360° in response to 360° driving controls. However, a stepping motor is designed so that the indicator revolves only 15 °, even in response to a drive control of 360°. The 15 ° drive control must be repeated to make the indicator rotate 360°. Thus, at a position 15 ° away from the indicator display position, there will be an identical control. As a result, in the case of a great impact such as from an accident when the indicator becomes misaligned, if the ignition is switched on to start driving while the indicator is misaligned, the indicator will function while misaligned. Thus, to return the indicator to the normal position in case this happens, when the ignition is switched on, the indicator positions are reset to their respective positions after the battery line is connected after it is cut. After the battery line is cut and reconnected, the indicators simply return to the zero position. The same operation is performed after voltage is restored if gauge functions are lost because of a voltage drop from cranking or the like. Furthermore, the indicator only returns 15 ° after the ignition is switched on or the lock is turned off. The indicator is not moved if it is not misaligned.

CAN COMMUNICATION INPUT SIGNALS TABLE

Signal	Transmitter ECU
Engine speed signal	Engine-ECU <M/T> or engine-CVT-ECU <CVT>
Vehicle speed signal	
Engine malfunction indicator lamp request signal	
Engine coolant temperature signal	
Shift lever indicator signal	
ABS warning lamp request signal	ABS-ECU or ASC-ECU
EBD (brake) malfunction indicator lamp request signal	
ASC indicator lamp request signal	
EPS malfunction indicator lamp request signal	EPS-ECU

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Signal	Transmitter ECU
Communication standby signal	ETACS-ECU
Driver's door "open" signals	
Ignition switch (ACC) signal	
Ignition switch (IG1) signal	
High-beam indicator request signal	
Turn-signal indicator request signal	
Fog lamp indicator request signal	
Illumination signal	
All doors "Open" signal	

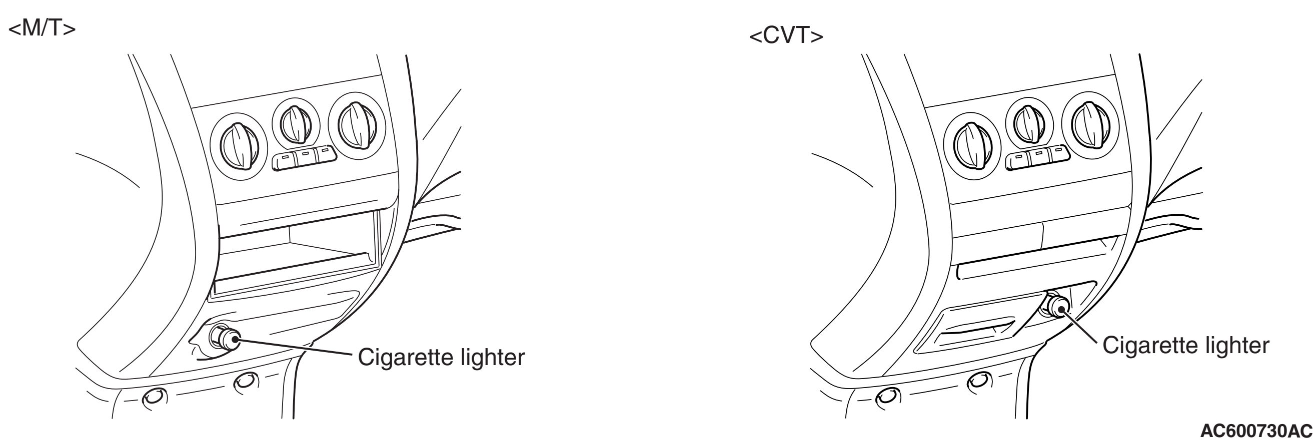
DIAGNOSIS CODE TABLE

Code No.	Diagnostic item
U1073	Bus Off
U1100	Engine-ECU <M/T> or engine-CVT-ECU <CVT> time-out (related to engine)
U1101	Engine-CVT-ECU <CVT> time-out (related to CVT)
U1102	ABS-ECU or ASC-ECU time-out
U1106	EPS-ECU time-out
U1109	ETACS-ECU time-out
U1120	Failure information on engine-ECU <M/T> or engine-CVT-ECU <CVT> (related to engine)
U1206	Flag invalid

CIGARETTE LIGHTER

M2540003300060

The cigarette lighter is installed to the centre lower panel.



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RADIO, CD PLAYER, SPEAKER, ANTENNA

M2540003200029

RADIO AND CD PLAYER

The electronically tuned AM/FM radio and CD player incorporating 1 DIN-size power amplifier (25W × 4) is provided.

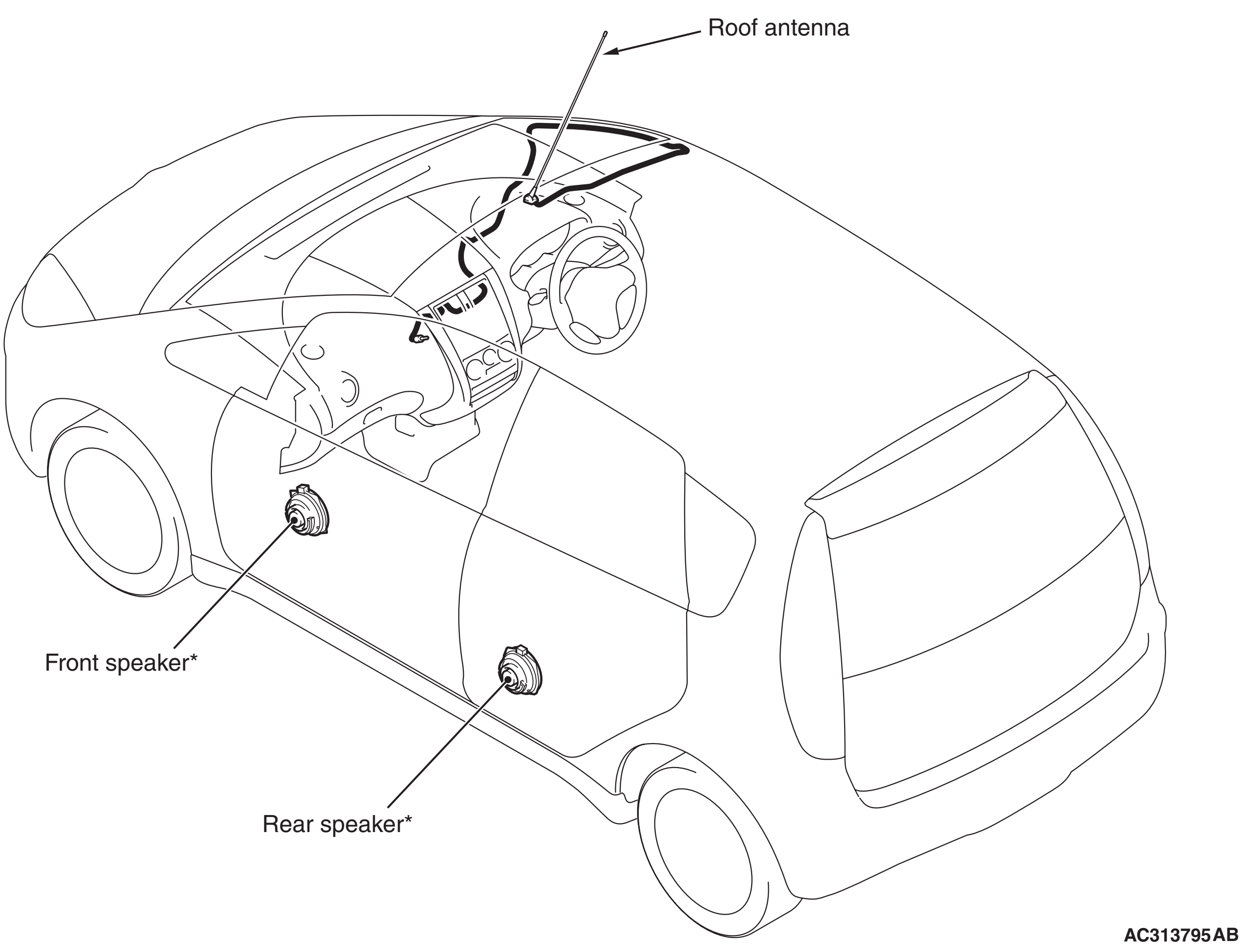
SPEAKER

Four speakers (front door: 13 cm, rear door: 13 cm) are provided. The speaker is a dual cone full range speaker.

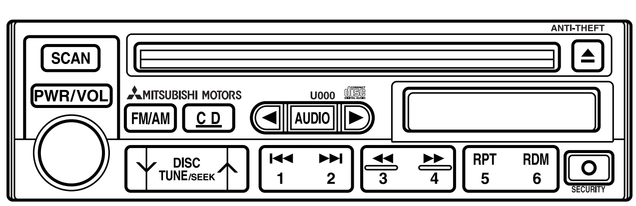
ANTENNA

A roof antenna is provided.

CONSTRUCTION DIAGRAM



AC313795AB



AC401638

*NOTE: The * indicates equipped on the left and right sides.*